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Metacognitive awareness of teacher candidates

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Abstract

In recent years, the terms "metacognition" and "metacognitive skills" have been drawing considerable attention in educational environments for their authenticity in terms of considering students' learning process, actual performance and potentials. One of the major difficulties on the field of metacognition has been to develop and put into practice valid surveys or inventories to measure metacognitive skills. Accordingly, this research aimed to determine the level of metacognitive awareness gained by the teacher candidates studying different subject areas. The study was carried out on various departments of a faculty of education. In the plot phase, 30-item-scale was applied to 200 students and Cronbach's alpha was 0.71. In the main phase, 92 students took part and the final version of MAS (Metacognitive Awareness Scale) was used with 24 items under 3 dimensions. Cronbach's alpha was 0.71. With regard to MAS total scores, no difference was found according to gender, high school type graduated, type of education whether it was day or evening and grade point averages. Results indicate that MAS scale yields profound information about students' self, level of metacognitive strategies usage and evaluation of their performance as well as effectiveness of strategies they use. This study also illustrates the need of training students to use metacognitive strategies in the learning environments.

Keywords: Metacognitive skills, metacognive awareness, self-regulated learning·

1. Introduction

The rapid change and major innovations in knowledge indicate the need of socially and mentally active learners who are aware of their own cognition. This awareness is based on the development, usage and sustainability of some skills related to metacognition. Gama (2004) defined metacognition as thinking about thinking or as a person's cognition about cognition. According to Schraw and Dennison (1994), metacognition is the ability to reflect, control and understand, in a self-aware mode, one's own learning and cognition. O'Neil and Abedi (1996) summarized the term of metacognition as the conscious and periodic self-checking of whether one's goal is achieved and, when necessary, selecting and applying different strategies. Furthermore, metacognitive skills include perception of oneself as a learner, an awareness of the nature of a task's components, and knowledge of when and how to use effective strategies (Kinnacon, Gleber and Kim, 1999). Accordingly, metacognitively aware learners are more effective learners, show higher performance levels, use more strategies and better regulate their own learning (Hammann and Stevens, 1998).

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Metacognition has a multi-component structure referring to the awareness and monitoring of cognition and its implementation. Panaoura and Philippou (2003) stated that knowledge of cognition and self-regulation of cognition were two basic dimensions of metacognition. Metacognitively aware learners are expected to regulate their own learning in order to engage in learning process vigorously. Zimmerman (2002) defined self-regulated learners as proactive in their efforts to learn, monitor their behavior in terms of their goals, and self-reflect on their increasing effectiveness, which enhances their self-satisfaction and motivation to continue to improve their methods of learning. In their research, Howard et al. (2000) focused on the development of a model for problem-solving activities and materials that would foster metacognitive self-regulation and they examined five aspects of the model: knowledge of cognition, objectivity, problem representation, subtask monitoring and evaluation.

Metacognitive theory has not focused on the development of metacognition mainly because researchers encounter serious methodological problems in their attempt to develop valid instruments measuring metacognition (Panaoura and Philippou, 2003). Thus, several researchers has developed and utilized some techniques for measuring metacognition in their empirical studies. Using rating scales is one of the most common techniques that can be categorized as a domain-independent measurement involving asking participants to answer or self-report on statements about cognitive processes. There were two inventories developed before much of the current research on metacognition; The Learning and Study Strategies Inventory (LASSI) (Weinstein, Palmer and Schultz, 1987) and the Motivational Strategies for Learning Questionnaire (MSLQ) (Pintrich and DeGroot, 1990). They were both criticized that they did not explicitly address specific metacognitive constructs. Schraw and Sperling-Denisson (1994), on the other hand, developed a 52-item Likert type self-report scale for adults under the name of Metacognitive Awareness Inventory (MAI) which measured both knowledge of cognition and regulation of cognition. Eight factors were taken into consideration, from which three related to knowledge of cognition and five related to regulation of cognition. Howard, McGee and Shia (1999), correspondingly, generated a 32-item-scale called the Inventory of Metacognitive Self-Regulation (IMSR) to measure five factors related to awareness of learning processes and control of learning strategies.

The present study focused on the standards of metacognitive skills gained by the teacher candidates in the pre-service training in order to help them gain the competence to transfer these skills to the students and improve the instructional designs of the institutions considering the shortcomings on the subject of metacognitive awareness. One of the findings in Ozcan's (2007) study revealed the fact that metacognitively aware teachers were capable of using some strategies to improve students' awareness of metacognition. Consequently, this finding indicates the vitality of developing teacher candidates' usage of metacognitive and self-regulation skills.

The purpose of this research was to determine the level of metacognitive awareness gained by the teacher candidates studying different subject areas. In the study design, the answers of the questions were analyzed whether there was a significant difference in perception of metacognitive awareness of teacher candidates based on their gender, school type being graduated before university, type of education whether it was day or evening and their grade point averages.

2. Methods

2.1. Participants

This study was carried out on various departments of a faculty of education with 92 students. By gender, the breakdown was 50% female and 50% male and by the type of education, it was 65% day and 35% evening.

2.1.1. Research design and implementation

In this study, the metacognitive skills were measured by the Metacognitive Awareness Scale (MAS) which was developed by the researcher. Scales consisted of brief information about the purpose of the study and demographic data was also attained.

2.1.1.1. Instruments and statistical analysis

The MAS (Metacognitive Awareness Scale) was formed after examining existing inventories in detail. Before implementation, one English Language teacher, one linguistic expert and one Turkish teacher were asked to assess the untreated form of the scale. In the plot phase, 30-item-scale was applied to 250 students and Cronbach's alpha was 0, 74. After eliminating 6 items considered inoperative, the final version of MAS was completed with 24 items under 3 dimensions. The items were answered on a five-point scale ranking from one to five. The minimum possible score is 24 and the maximum possible score is 120. Dimensions of the scale were as follows:

- Knowledge or awareness of self and strategies (how, why, when to use them): 8 items
- Cognitive and metacognitive strategies (Planning and goal-setting, organization, critical thinking, self-regulation): 8 items
- Evaluation (analysis of performance and effectiveness of strategies): 8 items

Cronbach's alpha coefficients for reliability were 0.88, 0.78 and 0.78, correspondingly, for the three dimensions. The value of Cronbach's alpha for the whole scale was 0.77 and it could be read that it was a highly reliable scale (Kalayci, 2009:405). In order to verify construct validity, an exploratory factor analysis was put into practice. After the analysis, it was seen that the items on MAS explained 47.28% of the variance of the scale. The factors explained 21.73%, 16.54% and 9.12% of the variance, respectively.

Student-t test was used to compare scores in accordance with gender, school type being graduated before university, type of education whether it was day or evening and their grade point averages. In order to compare scores between groups according to the high schools graduated, One Way Anova was used.

3. Results

3.1. Gender

Table 1 and 2 show that there was no difference on the scores of male and female participants ($p>0.05$). In respect of the dimensions of MAS, no difference was found between the scores of male and female participants.

Table 1. Comparison of the participants' scores according to gender.

	Gender	N	$\bar{X}$	SS	t	p
Metacognitive Awareness Scale	Female	46	83.13	10.75	0.181	0.857
	Male	46	83.50	8.69		

Table 2. Dimensional comparison of the participants' scores according to gender

Dimensions	Gender	N	$\bar{X}$	SS	t	p
1	Female	46	24.83	7.60	0.014	0.989
	Male	46	24.85	7.63		
2	Female	46	30.17	3.80	1.134	0.260
	Male	46	31.13	4.27		
3	Female	46	28.13	4.41	0.639	0.525
	Male	46	27.52	4.73		

3.1.1. School type being graduated before university

With respect to the high school types where the participants graduated from, three school types were determined. 40 students stated that they were graduated from Anatolian High schools and 23 of them were from Anatolian Teacher High Schools where they were exposed to a foreign language based education. As the third school type, general high school was marked by 23 students. After the analysis of the scores, the results showed that there was no significant difference between the participants in terms of high schools they graduated from.

Table 3. Comparison of the participants' scores according to the high school types.

Dimensions	Type of high school	N	$\bar{X}$	SS	F	p
1	General	29	26.93	8.05	2.039	0.136
	Anatolian High	40	24.5	7.62		
	Anatolian Teacher High	23	22.78	6.41		
2	General	29	30.55	4.38	0.473	0.625
	Anatolian High	40	30.32	4.17		
	Anatolian Teacher High	23	31.34	3.44		
3	General	29	27.51	4.49	0.132	0.877
	Anatolian High	40	27.85	4.68		
	Anatolian Teacher High	23	28.17	4.58		

3.1.1.1. Type of education

In the universities of Turkey, a binary education system is currently operative in terms of time period. In the first type, classes are being held in the day time and it is more common than the other one. In the second type, students follow classes in the evening and it is called evening education. The results of the analysis clearly explained the fact that there was no difference between the scores of the students who followed different types of education.

Table 4. Comparison of the participants' scores according to the type of education.

Dimensions	Type of education	N	$\bar{X}$	SS	t	p
1	Day	58	25.27	7.43	0.724	0.471
	Evening	34	24.08	7.86		
2	Day	58	30.68	4.47	0.115	0.908
	Evening	34	30.58	3.26		
3	Day	58	27.1	4.79	2.020	0.046
	Evening	34	29.05	3.87		

3.1.1.1.1 Students' grade point averages (GPA)

Table 5. Comparison of the participants' scores according to the grade point averages.

Dimensions	GPA	N	$\bar{X}$	SS	t	p
1	Below 3	45	24.42	6.92	0.512	0.610
	Above 3	47	24.23	8.20		
2	Below 3	45	30.66	3.98	0.33	0.973
	Above 3	47	30.63	4.15		
3	Below 3	45	28.71	5.04	1.847	0.068
	Above 3	47	26.97	3.89		

In the university on which this research was carried out, a 4-point-grading system is in use. In accordance with this grading system, participants were divided into two groups. The first group's grade point averages range from zero to three and the second group's range is between three and four. With respect to the grade point averages, the

results of the analysis indicated that there was no significant difference between the students having a gpa below 3 and the students having a gpa above 3 regarding their scores.

4. Discussion and conclusions

This study aims to present the reflections of the questions directed to the teacher candidates whether there was a significant difference in perception of metacognitive awareness based on some variables. In order to limit the aspects of the research, students' gender, high school type graduated, type of education whether it was day or evening and grade point averages were chosen and taken into consideration. As a result, no significant difference was found under all the variables determined. This outcome can be considered as a proof or verification of the fact that measuring metacognition with a scale or inventory could be challenging. Undoubtedly, expressing thoughts about cognitive and metacognitive systems and skills objectively can be hard for students. Schraw (1998) states that promoting metacognition begins with building awareness among learners that metacognition exists, differs from cognition and increase academic success (Panaoura and Philippou, 2003). In light of this evidence, the need of training students to use metacognitive strategies in the learning environments comes into prominence. In other words, students should be given activities which require them to become aware of what they know, plan what they need to learn, and monitor their strategy choices, so they can be self-directed learners (Kinnacon, Gleber and Kim, 1999).

Another inference concluded from the results of this study is to discuss and assess the effectiveness of the scale used in this research. Future replications of this study will look at a wider plot phase as a construct validity and reliability practice including more items with retrospective state instructions, more participants in number with different grades and departments and more time allotted for the whole process.

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